R E P O R T R E S U M E S

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A VOCATIONAL-TECHNICAL TEACHER TECHNOLOGY CENTER--THE DEVELOPMENT OF A MODEL, FINAL REPORT.

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A STATEMENT OF THE EDUCATIONAL PURPOSES AND SERVICES TO BE PROVIDED IN A "MODEL" TECHNOLOGY RESOURCE CENTER WAS FORMULATED AND AN ARCHITECTURAL DESIGN WAS DEVELOPED. THE CENTER WOULD SUPPLEMENT EXISTING INSTITUTIONS AND PROVIDE FACILITIES FOR VOCATIONAL-TECHNICAL EDUCATORS TO BE UPDATED IN THEIR FIELD OF TECHNOLOGY AND KEPT ABREAST OF NEW PEDAGOGICAL DEVELOPMENTS. PROJECT OBJECTIVES WERE--(1) TO DEVELOP EDUCATIONAL SPECIFICATIONS FOR A MODEL CENTER, (2) TO FORMULATE ARCHITECTURAL GRAPHICS AND DESIGN CRITERIA, AND (3) TO DISSEMINATE RESEARCH FINDINGS TO POTENTIALLY INTERESTED INDIVIDUALS, INSTITUTIONS, AND ORGANIZATIONS. A PANEL OF 12 CONSULTANTS INTERACTED BY INDIVIDUAL AND CONFERENCE TELEPHONE CALLS, DOCUMENTS, AND TWO MEETINGS TO DEVELOP AND REFINE EDUCATIONAL SPECIFICATIONS. THE PROPOSED CENTER CONSISTED OF TWO MAIN DIVISIONS--(1) A TECHNOLOGY COMPLEX DEVOTED TO THE UPDATING AND THE ENRICHMENT OF THE VOCATIONAL-TECHNICAL INSTRUCTIONAL PROGRAM AND (2) A RESOURCES COMPLEX DESIGNED TO PROVIDE ADDITIONAL EDUCATIONAL SERVICES TO VOCATIONAL-TECHNICAL EDUCATION SUCH AS CURRICULUM DEVELOPMENT (RESEARCH, EVALUATION, AND DISSEMINATION), MODEL DEVELOPMENT, AND THE IMPROVEMENT OF TEACHING-LEARNING TECHNIQUES, METHODS, AND MATERIALS. A CONFERENCE WAS HELD TO DISSEMINATE RESEARCH FINDINGS. (JM)

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5-0018

FINAL REPORT

A VOCATIONAL-TECHNICAL TEACHER TECHNOLOGY CENTER -- THE DEVELOPMENT OF A MOLEL, FINAL REPORT

RUTGERS - THE STATE UNIVERSITY
NEW BRUNSWICK, NEW JERSEY

Initiated by

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P.L. 81-152, Title III, Sec. 302 (c) (15);
Subpart A, Section 4(c) of P.L. 88-210,
(Vocational Education Act of 1963) 77 Stat. 405

Proposal Number ERD-111
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supported by a grant from the
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Office of Education

December 31, 1965

Technology-Resource Center

for Vocational-Technical Education

A Research Activity of

RUTGERS - THE STATE UNIVERSITY

New Brunswick, New Jersey

RUTGERS · THE STATE UNIVERSITY

GRADUATE SCHOOL OF EDUCATION
DEPARTMENT OF VOCATIONAL-TECHNICAL EDUCATION

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NEW BRUNSWICK, NEW JERSEY
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January 27, 1966

Dr. Sidney High
Project Officer
Division of Vocational-Technical Education
Department of Health, Education and Welfare
7th and "D" Streets, S.W.
Washington, D.C. 20202

Dear Dr. High:

The research project, "A Vocational-Technical Teacher Technology Center - The Development of A Model", has now been completed.

It gives us great pleasure to submit the final report and abstract in conformance with the provisions of the contract OE-5-85-043.

The interest of vocational-technical educators in this project has been exceedingly gratifying.

Your assistance and cooperation has been greatly appreciated.

Sincerely yours,

Milton E. Larson

Dr. Milton E. Larson
Principal Investigator

MEL:gk
Enclosure

A C K N O W L E D G E M E N T

Many individuals have cooperated in this Research Project. Their enthusiastic support and cooperation have provided additional motivation.

The concept has received the whole-hearted endorsement of such educational leaders as:

Dr. John O'Neill, Dean of the Graduate School of Education
Rutgers - The State University
Dr. Robert Worthington, Assistant Commissioner in Charge of
Vocational Education, State of New Jersey
Dr. Ernest McMahon, Dean, Continuing Education
Rutgers - The State University

Special recognition is due Dr. Carl Schaefer, Chairman of the Department of Vocational-Technical Education, Rutgers - The State University, for the initial conception of the idea.

The interest and effort of the following individuals who participated in the pre-planning aspects of this problem, and/or in the session of the Panel of Consultants engaged in the consideration of the factors incorporated into the Educational Specifications, is appreciated.

PANEL OF CONSULTANTS

* Ralph E. Bender	Ohio State University	Professor and Chairman Agricultural Education
* Pauline Burbrink	University of Texas	Specialist - Distributive Education
* William Dunton	Warren City Schools Warren, Ohio	Building Consultant Specialist
* Joseph Casey	Leeds & Northrup Company	Technical Consultant
Burr D. Coe	New Brunswick, New Jersey	Director - Middlesex County Vocational-Technical High School
Theodore Cote	State Department of Education, New Jersey	Director - Professional Services
Charles Drawbaugh	Rutgers - The State University	Assistant Professor Vocational-Technical Education

* Nicholas Eckert	New Brunswick, New Jersey	Architectural Consultant
Philip Edgecomb	Rutgers - The State University	Research Specialist
Nicholas Frigiola	State Department of Education, New Jersey	Director - Technical Education
Gerald Griess	Rutgers - The State University	Lecturer in Education
Robert Joy	State Department of Education, New Jersey	Director - Distributive Education
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* C. Thomas Olivo	State Department of Education, New York	Trade and Industrial Education
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Ralph Rush	Rutgers - The State University	Lecturer in Vocational-Technical Education
Merna Samples	Rutgers - The State University	Chairman, Home Economics
* Carl Schaefer	Rutgers - The State University	Chairman, Department of Vocational-Technical Education
Benjamin Shapiro	Rutgers - The State University	Director - Curriculum Laboratory

* Elizabeth Simpson	University of Illinois	Head-Home Economics Teacher Education
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Bruce Tuckman	Rutgers - The State University	Associate Professor of Education
* Arthur Walker	Richmond Professional Institute	Professor - Business Education
Alvin Weitz	State Department of Education, New Jersey	Supervisor - Business Education

* Principal consultants for research project

To all who have assisted in this Project, we express our appreciation.

Milton E. Larson
Project Director

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BACKGROUND

Virtually few opportunities exist at most institutions of higher education for updating vocational-technical educators in the new developments of industry and technology. Facilities satisfactory for this purpose must not be confused with the traditional industrial arts type of space and equipment; nor with those of the current colleges of engineering. These facilities, although often excellent for the purpose intended, are not designed to meet the needs for updating vocational-technical educators in current skills and knowledges of a rapidly developing space-age industrial society.

As a result of the lack of adequate facilities for updating vocational-technical in-service educators (and for strengthening pre-service and graduate school students as well), most colleges and universities offer teacher education courses mainly classified as "methods" courses. While these are important, and need to be part of pre-service and in-service education, they are not designed to, nor do they, provide the essential upgrading in "subject-matter" concerned with new innovations in technology.

While the need for updating vocational-technical education exists in all areas, the need is especially urgent in technical education and in trade and industrial education. Home economics, business education, distributive education, and agricultural education face some of the same problems, but with varying degrees of urgency. All will benefit greatly by participation in a forward looking program of updating and upgrading.

If the rich promise of technological advancement is to be shared by all, adequate opportunities must be developed for updating teachers. Once vocational-technical teachers are employed, they are faced with a constant challenge of keeping pace with changes and new innovations in their respective fields. Students who graduate from vocational-technical curricula of the secondary and post-secondary schools, need the benefit of instructors and other educators who have kept attuned to such changes in present-day technology as a result of the new innovations, automation, cybernation, and a tremendous number of recent developments significant today in our world of work. These needed concepts of scientific knowledges and industrial skills must be integrated with the technologies of education and the most recent developments in pedagogy, if high quality teaching and learning is to be achieved.

PURPOSE

The purpose of the study was to devise a vocational-technical teacher technology center model for keeping teachers updated in their occupational fields, and abreast of new developments in pedagogy.

OBJECTIVES

Specifically, the objectives were:

1. To develop the educational specifications for a "model" center.

2. To formulate architectural graphics and an outline of structural considerations related to design and construction of such a facility.

3. To disseminate the research findings to potentially interested individuals, institutions, and organizations.

PROCEDURES

The research project was carried out in two distinct phases: (1) development of educational specifications; and (2) innovation of architectural design (preliminary plans) supported by considerations for facility construction and site selection.

Several distinct steps constituted the essential development consummating in the final draft of the educational specifications.

Careful consideration was given to the selection of a Panel of Consultants who became the "task force" which contributed immensely to the total research project. Individuals selected have a national reputation and are highly knowledgeable in their own specialty of vocational-technical education. Others were invited to participate because of their professional achievements in the fields' facilities, the technologies of education, and architectural consulting services. Members of the Panel of Consultants are identified in the Acknowledgement of this report.

Assessment of progress made by other institutions towards the purpose and objectives of the project resulted from a series of field study visitations made by the Architectural Consultant and the Principal Investigator. Facilities were studied at: University of Illinois, Urbana, Illinois; General Motors Research Laboratory, Warren, Michigan; Michigan State University, East Lansing, Michigan; Oklahoma State University, Stillwater, Oklahoma; San Jose State College, San Jose, California; University of New York, Buffalo,

New York; and Harkness Center, Buffalo, New York. While a number of ideas were gleaned from the field study, none of the facilities visited encompassed the scope and purpose as specifically identified with this research project.

Two major activities were preliminary to the initial meeting of the Panel of Consultants. (1) Orientation of consultants was achieved by study of the approved proposal and supplementary written information, and through direct personal contact by means of a personal telephone conversation and a second conference call. (2) Each consultant developed a series of "Pre-Planning Session Concepts and Ideas". The efforts of each individual were compiled into a book of "Resource Materials for Session I", prior to the first session.

The first session of the Panel of Consultants was held on June 28, 29, 30, and July 1, 1965. As a result of the innovations and common understandings developed at this session, the preliminary draft of the educational specifications was formulated. Detailed consideration was given to such topics as the:

Concept, purpose, and possible implementation
General statement of philosophy
General characteristics of students to be served
Specific characteristics of offerings
Spaces required and ancillary services needed
Pedagogical hardware desired

After the conclusion of the initial session, the preliminary draft of the educational specifications was developed and submitted to consultants for review and criticism.

The architectural consultants then focused on the educational specifications, developing space relationship studies and preliminary graphic sketches. Joint consideration of preliminary sketches resulted in the preliminary plans submitted to the consultants for study, prior to the second session.

The second session of the consultants, September 8th, 9th, and 10th resulted in the revised educational specifications. The impact of group discussion, review and evaluation of the preliminary architectural design, and the initial educational specifications, resulted in considerable refinement of both instruments.

The educational specifications were rewritten and again submitted to the Panel of Consultants for review, evaluation, and criticism. Suggestions received became the basis for further refinement of the educational specifications. (Educational specifications are contained in Appendix A).

Close coordination between the Architectural Consultant and the Principal Investigator, utilizing the revised educational specifications, resulted in the development of the architectural plans, (preliminary) structural and site details, (outline) as identified in this report (See Appendix B).

To hasten implementation through dissemination of research findings, a Dissemination Conference was held on December 17, 1965. Approximately sixty guests from several states attended the conference. Presentations of the findings by the Chairman, Department of Vocational-Technical Education, the Architectural Consultant, and the Principal Investigator were reinforced by group dynamics of participants, focusing on methods of securing immediate implementation. Participating in the conference were the Project Director from the U.S. Office of Education in Washington, D.C., and the Assistant Commissioner of the State Department of Education for New Jersey.

RESULTS

The results of this research project are contained in Appendix A, Educational Specifications, and Appendix B, Brochure of Architectural Graphics and Construction Considerations. Review of these instruments strongly suggests the high quality of the project, and the significance of the project for strengthening the field of vocational-technical education.

Recognition of the need for such a facility, and the kind of updating program planned for, was evident by the consultants and most other individuals contacted during the period of the research project.

This has been a most gratifying experience. The unified support of the concept and its suggested implementation reinforces the "need" previously suggested.

RECOMMENDATIONS

It is recommended that:

1. Wide dissemination of the findings of this study be made throughout the United States.

2. Vocational-technical teacher education institutions, and State Departments of Education of the various states, be encouraged to explore means of implementing the concept and findings of this research project.

3. Cooperation of two or more states supporting a unified Technology-Resource Center for Vocational-Technical Education may be realistic in some areas.

4. Additional consideration be given in each area to the relative needs of that area. In some areas, the number of modules may be increased or decreased from the basic four suggested.

5. Further thought and research be devoted to the components most essential for the Resource Center in the particular area. In some areas, a computer center may realistically be identified with the Resource Center; while in others the curriculum development operation may be retained in its present facility.

6. Every effort be made to secure implementation of the concept and the research findings, in order that essential opportunities be provided for updating vocational-technical education (strengthening pre-service education and graduate study) so that the challenges of preparing young adults for effective participation in the space-age world may be achieved. Vocational-technical educators no longer can meet the needs of the present, and the future, by dependance upon the current concepts of ten or twenty years past.

7. United States Department of Education, State Departments of Education, and vocational-technical teacher education institutions give serious consideration to the principle so frequently verbalized, that learning for vocational-technical educators is a continuous process, and needs to be provided for in a facility geared to provide the kind of education essential for updating in new developments in technology, science, and pedagogy.

8. A brochure circulated by the Superintendent of Documents, and the United States Office of Education providing basic information relating to the Technology-Resource Center for Vocational-Technical Education. Content of this report, and attached appendices, contains information for such a brochure.

E D U C A T I O N A L S P E C I F I C A T I O N S

TECHNOLOGY-RESOURCE CENTER FOR VOCATIONAL-TECHNICAL EDUCATION

I. Nature of Project

The objective of the project was to devise a Technology-Resource Center for Vocational-Technical Education for keeping vocational-technical educators updated in their field of technology, and abreast of new pedagogical developments. Hereafter, this center will be called the Technology-Resource Center, or if reference is to one of its principal units, the Technology Center, or the Resources Center.

The problem was to develop the educational specifications and the preliminary architectural plans and engineering specifications (outline) for the Center.

This research project was possible by the approval of a Developmental Proposal by the U.S. Commissioner of Education, under the provisions of Section 4(c) of the Vocational Education Act of 1963.

II. Need for Project

The rapid development of new innovations in technology, and the emerging multiplier-effect in scientific knowledge in a rapidly changing dynamic and highly mechanized society, mandates action to provide additional services and facilities to update educators in the field of vocational-technical education.

To achieve maximum competency in vocational-technical education, a unique physical complex, not presently found, is needed. Such a facility suggests a design and construction highly flexible and readily adaptable to changing concepts, needs, and new developments resulting from the ever-changing innovations of science, technology, and industrial applications.

Traditional university offerings towards advanced degrees need to expand their programs to continuously update teachers in their specialties and methodology. State departments of education, and other institutions providing programs for updating educators, likewise, must identify this need as significant, and strive to strengthen teachers' proficiencies by insuring adequacy of programs in teacher education.

While other institutions, both public and private, provide some assistance in updating educators in the vocational field, the need for a concentrated and focused effort is essential in order to provide the

impact mandatory to the solution of this problem. If the lag in subject-matter knowledge and other essential competencies (including manipulative skills) is to be overcome, a new approach and a new facility must be developed.

Recognition must be given in teacher education to the principle so frequently verbalized, that "learning is a continuous process".

III. Area Served

The unique characteristics of the Technology-Resource Center suggest an area or regional division of service which may be interstate as well as intrastate. Population, area, and the nature of industrial and scientific activities, will be factors in the natural determination of the geographic region to be served. Cooperation of two or more states in such an institution may not only be highly desirable, but extremely likely during the initial implementation of this plan of updating and enriching educational personnel.

IV. General Statement of Philosophy

The fundamental purpose of The Center shall be to aid in keeping vocational-technical teachers updated in their field of technology and abreast of new pedagogical developments, utilizing the findings of applicable research.

The Center should provide a maximum of service, and represent the ultimate in educational innovations, so as to inspire and motivate, enrich the background and broaden the scope, enlarge the scientific and technical knowledge and understanding, and increase the ability to apply, in practical situations, the experiences herein gained.

The Center will need to encompass the most advanced planning in terms of adaptability for technology demonstrations, institutes, seminars, work-shops, and similar educational updating experiences for individuals directly and indirectly involved in vocational-technical education.

Such a facility suggests a design and construction highly flexible and readily adaptable to changing concepts, needs, and new developments, resulting from the ever-changing innovations of science, technology, business, agriculture, home economics, and industrial applications.

The Center will need to provide the most effective and up-to-date pedagogical hardware. Moreover, it should serve as a model

development, design and implementation center for the effective utilization of such aids and a location for investigation into the improvement of teaching and learning techniques and materials, as well as the innovation and development of new materials, methods, and techniques.

The Center will bring together in one uniquely designed facility those forces and disciplines that will permit the simultaneous updating and upgrading of teachers in terms of advancing technology and methodology and the development of modern curricula and other mass media teaching-learning materials.

The Center will accelerate and make possible the development of new skills, technical knowledge and related content through the actual utilization of materials, tools, equipment, instruments, and the like, consistent with evolving technology and occupational practices.

The Center will need to provide opportunities for learning by active participation as well as through audience situations.

The Center must become a vital part of the educational environment as it serves the needs of students, teachers, supervisors, guidance personnel, administrators, business, agriculture, home economics, and industrial practitioners, as well as others who are interested and concerned with vocational-technical education.

V. Basic Concepts of Operational Policy

Among the more significant basic concepts of operational policy are the following:

Potential capabilities need to be built into The Center to meet the needs of educational personnel who may be available on an off-time (or part-time) as well as on a full-time basis.

Planning, developing and conducting programs and activities of The Center, in cooperation with other institutions of higher education, will utilize and compliment other desirable and available public and private resources of equipment, technical knowledge, physical plants, and the like.

A base staff, serving on a full-time basis, will provide for continuous planning and coordinating. A supplemental call staff will need to be utilized to provide some of the aspects of technical and professional updating desired.

Services and programs of The Center will be conceived, planned, and coordinated to serve the needs of teachers within an area,

state, and/or an inter-regional geographic area of more than one state.

Graduate and undergraduate credit should be given in co-operation with other universities and colleges to supplement credits available from such institutions for areas of instruction which they may not offer. While all offerings of The Technology Center will not carry collegiate credit, such credit should be given whenever possible. Evidence of successful completion of non-credit courses, in the forms of certificates and cards, may be used.

Curricula for updating educational personnel will need to reflect both horizontal articulation and vertical coordination. Horizontal articulation expresses the concept of broad implications across the areas of the instructional fields. Vertical coordination indicates a level of program descriptive of "depth". Both horizontal articulation and vertical coordination may be reflected in the same curricular activity.

Educational materials originating at The Center need to be made available to those who participate directly and indirectly in instructional programs in which the updating activities, sponsored by The Center, are significant to the improvement of instruction.

Evaluation, and resultant research-related activities, need to be a part of the vital activities of The Center.

Vocational-technical education has now achieved a greater degree of maturity. It has come of age. As a result, it must assume a greater role in meeting its own needs and services as it works closely with other subject-matter disciplines, community and professional organizations.

VI. General Characteristics of Students

The main clientele of the Technology Center will be concentrated and focused to give priority to teachers, teacher educators, vocational administrators, and chief school administrators, together with supporting staff, like principals and guidance personnel.

Other use of the facility will be made by such other groups as boards of education, state supervisors, industrial and business management groups, union leaders and union members, industrial development commission individuals, and industry and business practitioners.

On certain occasions, students, including youth groups, extension student groups, and students in curricula, other than vocational education, who are interested in recent developments in vocational education, may be invited to share special activities sponsored by The Center.

The limitations of clientele and use of The Center will result from the failure: (1) to meet the updating needs of the teachers and other related groups; (2) to make known, or available, possible services; and (3) the failure resulting from the lack of vision of those who serve, administer, and provide the essentials for the operation of the Technology-Resource Center.

VII. General Characteristics of the Physical Plant

A. The physical plant must be designed to meet the needs of short-time activities of such duration as 2 to 4 hours, 1,2, or 3 days, 1 to 3 weeks, and a variety of combinations of short time spans.

B. The physical plant should be located in a convenient and easily accessible geographic area.

C. The site needs to provide adequate space for the facility and, in addition, room for parking, loading and unloading, and the activities listed as outdoor functions of The Center, and space for expansion.

D. The multi-purpose use of The Center must be constantly considered in the planning and designing phases.

E. The Center will be utilized as a facility to demonstrate, and to provide learning participation activities, in addition to lecture-discussions and conference-type student teacher updating activities.

F. The Center will be utilized by groups seeking specific information, knowledge, and skill involving equipment, technological and scientific principles, and pedagogical techniques.

G. Units of the most recently developed equipment will be moved in, used for brief periods of time, and then returned to the vendor or industrial plant. Detailed consideration needs to be given to providing maximum ease and convenience in moving, installing, using, and removing heavy (up to 10,000 pounds) units of equipment, as

well as smaller and more conventional equipment. Adequate provision must be made for loading and unloading, handling, crating and uncrating, moving, including millwright-related activities.

H. Fundamental and recently developed methods, techniques, and technological aids to education, for providing effective instruction in vocational education, need to be considered in planning the total facility and the individual learning spaces.

I. Combinations of uses of teaching-learning and auxiliary spaces, to secure maximum and balanced utilization, should be considered.

J. Design considerations need to blend the functions of the Resources Center with the Technology Center to provide maximum utilization, individually and jointly, of the spaces and facilities of each with a minimum of duplication and without omission of essential opportunities for learning and servicing educational personnel in updating activities.

K. Design considerations need to blend the functions of teacher learning resources with teacher training to make maximum use of the total facility.

L. Provision must be made for development activities related to teaching-learning functions in the Resources Center and in the Technology Center.

VIII. Instructional Spaces

Institutes and workshops, demonstrations, and instructional methods seminars describe the broad classifications of main activities which will be carried on at The Center. The activities require special design and construction features.

As used in this research project the word "module" has a special meaning. Module is used to describe a principal teaching-learning space for updating instructors relative to specific equipment, as well as applications, techniques, and processes utilizing this equipment. A module may be utilized for some or all of the functions of a laboratory, shop, or industrial demonstration, research or production area. A module is a "key" area for updating educators in new principles, theories and procedures, and their applications as used in business, agriculture, home economics and industry.

The instructional suite of The Center consists of a minimum combination of modules together with essential auxiliary spaces for required supporting activities.

The module may be provided in multiples as desired to meet specific needs. Expansion of or the use of additional modules may reflect greater emphasis in some instructional fields than in others.

The model instructional suite of The Center (as identified in this study) will consist of four modules. These have been identified as a heavy equipment module, a medium equipment module, a small equipment module, and a modified small equipment module.

INSTRUCTIONAL MODULE - SMALL EQUIPMENT
(Illustrations of Essential Characteristics)

Areas of Service

Distributive Education
Technical Education
Health Services Education
Home Economics Education
Business Education
Trade and Industrial Education

Limitations or explanations of need

Demonstration area and work tables and work spaces for 20 people. Minimum of 1200 square feet.

Must provide for a minimum of 6 work groups of 3 students in each group.

Interference-free shielded room. Minimum size of 60 square feet with minimum height of 7 feet having adequate ventilation.

Radiation shielding (Research topic to determine if feasible).

Drains for chemical waste.

Support (overhead-floor) for demonstration materials.

Rear screen projection.

Unique characteristics

Special lighting for true color perception.

Power characteristics: 110, 220, 440 (or comparable) voltages, 1 and 3 phase current; voltage regulation (stability of voltage); light level control

Water: standard pressure
Air: (filtered) adjustable 10" H_2O to 150 lb/sq. in.

Access to gases: Natural gas, hydrogen, oxygen, propane, nitrogen and argone-helium.

Vacuum: (portable) with appropriate regulators

Central vacuum cleaning system

INSTRUCTIONAL MODULE - SMALL EQUIPMENT
(Illustrations of Essential Characteristics)
- Continued -

Unique Characteristics (continued)

Electromagnetic shielding (Research this topic to determine if feasible)

Electrostatic filtering, air conditioning and humidity control

Special construction features

Instructor's preparation area minimum size 10' x 30'. Floor covering to minimize physical and accoustical fatigue. Ceilings and walls to minimize physical and accoustical fatigue.

Door (power operated) 10' x 10'

Ceiling height 12' - 16'

Provide flexible source of utilities - overhead preferred.

Provide floating floor for this entire module.

Specimen storage

Closed circuit TV

Rear screen projection. Audio equipment. Mounted screen, flannel board, and chalk board on multiple track.

Students in both small equipment modules to share common toilet and locker room facilities. Separate facilities for men and women.

INSTRUCTIONAL MODULE - MEDIUM EQUIPMENT
(Illustrations of Essential Characteristics)

Areas of Service

Agricultural Education
Trade and Industrial Education
Technical Education
Distributive Education
Business Education
Health Services Education

Limitations or explanations of need

20 students maximum

Need to consider 5 groups of 4 persons each

Minimum of 2000 square feet

Unique characteristics

Special lighting for true color perception

Power characteristics: 110, 220, 440 (or comparable) voltages, 1 and 3 phase current; voltage regulation (stability of voltage); light level control

Water: standard pressure
Air: (filtered) adjustable 10" H_2O to 150 lb/sq. in.

Access to gases: natural gas, hydrogen, oxygen, propane, nitrogen, and argone-helium

Vacuum: (portable) with appropriate regulators

Central vacuum cleaning system

Electrostatic filtering

Air conditioning and humidity control

Sewer waste products disposal

Display cases (built in)

Overhead to floor support for demonstration materials

INSTRUCTIONAL MODULE - MEDIUM EQUIPMENT
(Illustrations of Essential Characteristics)
- Continued -

Special construction features

Self-contained toilet and locker facilities

Floating floor for entire module

Power outlets on 6' grid center.

Door 10' x 10'

Ceiling height 12' - 16'

Cavity wall or floor tunnel for utilities

Closed circuit TV

Rear screen projection. Audio equipment. Mounted screen, flannel board, and chalk board on multiple track.

INSTRUCTIONAL MODULE - HEAVY EQUIPMENT
(Illustrations of Essential Characteristics)

Areas of Service

Trade and Industrial Education
Agricultural Education
Health Service Education

Limitations or explanations of need

Maximum size of group 20 students

Unique characteristics

Loading platform, floor level near staging area. Large door 12' high, 14' wide.

Storage on same level as loading platform. Hydraulic lifts on platform.

Mobile seating step-up platform (3 tiers high) on wheels.

Power characteristics: 110, 220, 440 (or comparable) voltages, 1 and 3 phase current; voltage regulation and stability; light level control. (With central control).

Water: standard pressure with drains
Air: (filtered) adjustable 200 lb/sq. in.

Portable exhaust unit with added capacity in addition to normal ventilation.

Vacuums (portable) with appropriate regulators.

Central vacuum cleaning and dust removal system.

Electrostatic filtering.

Air conditioning and humidity control.

Central control for recording and distribution simultaneously.

Monitoring type of TV

INSTRUCTIONAL MODULE - HEAVY EQUIPMENT
(Illustrations of Essential Characteristics)
- Continued -

Special construction features

Horizontal draft, exhaust ducts in ceiling and floor. Outside manifolds exhaust capacity of 8000 CFM.

Concrete floor for 10,000 lb. machines. Separate floating floor for entire module.

Built-in fire extinguishers.

Covered loading and unloading area.

Tap-in electronic utilities for outdoor and indoor use.

Ramp to loading platform. (Hydraulic lift on platform). Self-contained toilet and locker facilities.

Auxiliary exhaust capacity in addition to standard exhaust system.

Floor drains.

(Consider lead shielding for X-ray machine).

Exterior tap-in service cavity with duplicate power utilities.

Closed circuit TV.

Rear screen projection. Audio Equipment. Mounted screen, flannel board, and chalk board on multiple track.

Central supply system with security control for compressed air.

Isolated storage area for combustibles.

SUMMARY OF CHARACTERISTICS OF MODULES OF BASIC INSTRUCTIONAL SUITE

Feature or Characteristics	Module		
	Small	Medium	Heavy
1. Number in a single group to be provided for	18 - 21	20	20
2. Number of groups that would be desirable at one time in this module	2*	1	1
3. Approximate space required (for a single group)	1200 sq. ft.	2000 sq. ft. (Self-contained toilet and locker room extra)	2000 sq. ft. (Self-contained toilet and locker room extra)
4. Ceiling height	12' - 16'	12' - 16'	12' - 16'
5. Physical arrangement		Rectangular 40' x 50'	There should be an area for staging, reviewing, recording, and practicing plus storage and personal service
6. Basic items to be permanently retained in this space	1. Equipment for maintenance. 2. Items for maintenance of instructional materials. 3. Specialized audio-visual equipment, TV	1. Utilities 2. Storage (small and medium sized items) 3. Specialized audio-visual equipment, TV 4. Light control	1. Portable seating arrangement for reviewing demonstrations 2. Viewing and listening amplification equipment, audio-visual, TV. 3. Mechanical and utility services.

SUMMARY OF CHARACTERISTICS OF
MODULES OF BASIC INSTRUCTIONAL SUITE
-Continued-

Feature or Characteristics	Module		
	Small	Medium	Heavy
6. (continued)	4. Light control both artificial and natural		4. Basic hand tools 5. Light control
7. Other		There should be a TV studio for major demonstrations piped to medium equipment lab, etc.	1. Internal communications system. 2. Regular first-class safety materials used

NOTE: *A second module similar in size to that identified, but requiring different fixtures and possibly fewer utilities than the first. This second module is to serve as a planning and design area to house such activities as layout, drafting, and planning for Distributive Education, Technical Education, etc.

IX. Ancillary Spaces (Inside)

A number of auxiliary services need to be provided as support functions for the learning-teaching activities housed in the modules. While these functions need to be performed, several may be so closely related that the same space can serve for several of these services. Even though spaces are identified as separate spaces, combinations, whenever possible, are highly desirable in order to reduce the space needed for support activities.

ANCILLARY SPACES (INSIDE)

Space	Function	Characteristics	Size of Space Needed
1. Administrative suite	Planning, coordination, fiscal management, and administration	Central office. (Intercom but no P.A. system).	
a. Director's office		Convenient to secretarial office	224 sq.ft. (14' x 16')
b. Asst. Director's office		Convenient to director's office	140 sq.ft. (10' x 14')
c. Secretarial office (2-4)	Records, file, duplication, etc.	Have machine room. Provide storage.	600 sq.ft.
2. Programming office	Plan programs and coordinate instruction	For full or part-time staff (permanent)	400 sq.ft. with division for 2 units
3. Technician's area	Headquarters for technicians: set up equipment, etc.		200 sq.ft. with storage and utilities
4. Custodial room	Janitorial services, security, groundskeeping, etc.	Storage, sink, utilities, etc. (Need other slop-sinks conveniently spaced)	200 sq.ft.
5. Public lounge	Reception area for guests	Convenient to office and rest rooms: have small kitchenette	400 sq.ft.
6. Employee's lounge	For staff	Adjacent to area for vending machines for staff and students	400 to 1000 square feet for lounge and vending machine area

ANCILLARY SPACES (INSIDE)
(Continued)

Space	Function	Characteristics	Size of Space Needed
7. Coadjutant staff workroom	For off-campus staff	Office and work area	200 sq.ft.
8. Utilities	House sources for: air, hydraulics, gas, pneumatics, electricity, steam, exhaust, dust, etc.	Under control of licensed personnel	Code or as needed to meet mechanical equipment
9. Instructional observation area	Provide opportunity to see and hear activities in modules from a central area		400 sq. ft.
10. Storage-millwright	Uncrating, loading, unloading, checking in, and checking out, and operation of forklift	Should be located near learning laboratories. (Person needs plumbing and electrical knowledge)	600 sq.ft.
11. Central service for instructional equipment	Repair, calibration, and maintenance of equipment as a service function	(Person needs electro-mechanical-hydraulic technological background) Need all utilities and wall storage areas	400 sq.ft.
12. Exhibit and display area	Display current, informational, educational, industrial, and scientific items	Should be near lounge, reception area, library or similar area.	Wall glassed-in areas and free standing glassed cases
13. Rest rooms	For male and female	Convenient to lounge and office	

ANCILLARY SPACES (INSIDE)
(Continued)

Space	Function	Characteristics	Size of Space Needed
14. Common rest rooms and locker rooms (students in small module)	Separate for male and female students	Convenient to small modules	Code (Minimum 40 students)
15. Staging area	Assemble, check out, tune, adjust, instructional and/or demonstration equipment	Should be adjacent to modules. One could serve two or more modules	600 sq.ft. each
16. Equipment room	Combined with the utilities room	May be a common area	As needed for equipment for physical plant
17. Central control for audio-visual distribution	Instructional mass media (A.V. specialist and technician)	Tape control. Rear screen projection. Audio recording. Electronic distribution. TV control. Films and slides. Contiguous to demonstration area	400 sq.ft.
18. Individual learning spaces	Provide learning opportunities of varying levels of student abilities	Carrels in library with ear phones, audio and visual receiving equipment, and 8 mm loop projection (Conduit and power for individual control and group control)	6 carrels each 6' x 8' Power as needed. Light control

ANCILLARY SPACES (INSIDE)
(Continued)

Space	Function	Characteristics	Size of Space Needed
19. Multigroup instructional area	Lecture, films, orientation, small conferences, seminars, and projection TV	Should be able to divide into 3 conference rooms each 30' x 20' that can be opened to one room with demonstration area at one end	Provision for light control. Provision for audio-visual equipment, TV, etc. Mounted screen, flannel board, and chalk board on multiple track. (Interchangeable)
20. First aid room	Emergency and routine first aid	Close to toilet and modules	80 sq.ft. (8' x 10')
21. Refrigeration storage room	Specimens, food, etc.	Near modules	80 sq.ft.
22. Large group instructional area	Large group meetings	(Include as common learning area, if possible)	For 300 - 400 people Provisions for audio-visual equipment, TV. Mounted screen, flannel board, and chalk board on multiple track.

X. Ancillary Spaces (Outside)

ANCILLARY SPACES (OUTSIDE)

Space	Function	Characteristics	Size of Space Needed
1. Outside demonstration area	Show and demonstrate items too large to have in the heavy module.	Provide outside cover (as tent). Need cement slab with utilities. Provide drainage.	12,000 sq.ft. with 4000 sq.ft. of concrete and remainder soil or blacktop.
2. Loading dock	Unloading-loading of items.	Should be on same level as demonstration area. Could have a hydraulic platform.	300 sq.ft. to serve modules.
3. Parking	Parking cars.	Black top with drainage.	80 - 100 cars.

XI. Ancillary Spaces (Special mention)

These spaces are closely related to the modules.

1. Rest rooms, locker areas, etc., as indicated under each of the modules.
2. Isolated storage for combustible materials. This should be removed from the main structure. This could serve as storage for gases and radioactive materials.
3. Refrigerated storage convenient to modules.
4. Storage walls and additional regular storage space in and for each module.

XII. Pedagogical Hardware

The items identified need to be provided for in each of the modules of the educational suite, and in other areas as indicated.

1. White chalkboard 6' x 8'. For illustrating wiring circuits, making schematics, etc. (This is especially necessary in the small equipment module and the medium equipment module).
2. Chalkboards, (black) flannel board, bulletin board, etc., in a multi-track permanent mounting for interchangability.
3. Facilities for rear screen projection.
4. Permanently mounted screen for overhead projector.
5. Variable light control.
6. Conduit for closed circuit TV and provision for installation of TV.
7. Provision for use of magnification TV in modules.
8. Consider initial installation of projection TV using video tape.
9. Photo-copy equipment, micro-film equipment, electrostatic process equipment (zerox).
10. Student response stations (Edex or similar) in group instruction room.
11. Installations for charts, newspaper pads, display racks for posters, flannel board presentations, etc.
12. Data retrieval system, in Resources Center, for data collection for evaluation and research related activities to determine the efficiency of various methods and techniques of updating educational personnel. Conduit from classroom to data collection area. (See XV, 1.)
13. Control for electronic teaching aids from the front of each module or teaching-learning space.
14. Convenient electrical outlets and other service connections to functions of each module and teaching-learning space.

XIII. Resources Center

The Resources Center has been conceived as an integral part of the Technology-Resource Center. Both provide teacher updating. Both are closely related; therefore, it is natural that both will be housed in the same physical plant.

The Resources Center consists of several divisions, each having individual functions and characteristics. The principal divisions are:

A. Library
   1. To house a limited supply of instructional materials as books, periodicals, and pamphlets. (5000 volumes; 12 to 16 files, etc.).
   2. To house sources for materials on microfilm.
   3. Indexes of available materials; bibliography development.
   4. Should provide for carrels. (See Ancillary Spaces - Inside).
   5. Minimum seating capacity of 20 to 40 people.
   6. Should be approximately 1200 square feet, including carrels for learning stations.

B. Curriculum development and evaluation center (Plan, develop, reproduce and disseminate curriculum materials).
   1. Curriculum development area
      a. Multi-office area for two staff members plus secretarial staff.
      b. Writing rooms for 10 teams of two persons each; individual rooms to be provided by folding doors of ceiling height.
      c. Curriculum development to be separate from the reproduction area.
      d. Approximately 1000 square feet required. (Adequate for above requirements)
   2. Evaluation and research-related functions
      a. A physical center for data collection.
      b. A center for graduate students to carry on research on a cooperative basis with other institutions.
      c. A center for evaluation of instructional materials.
      d. Part of the curriculum development area.
      e. Multi-office area for two staff members plus secretarial staff.
      f. Approximately 1000 square feet required.

C. Reproduction area
   1. Equipped with basic equipment for reproduction as: offset press, light table, paper cutter, camera and dark room, mimeograph, ditto, photo-copy machines, etc. (Consider need for sub-divisions).

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education
Division of Adult and Vocational Research

Vocational Education Act of 1963
(P.L. 88-210, Sec. 4(c))

PROJECT SUMMARY - ERD-111-65 5-0018
Contract No. OE-5-85-043

TITLE: Development of a Technological Center for Keeping Vocational Teachers Updated in Their Fields

PRINCIPAL INVESTIGATOR: Mr. Milton E. Larson, Technical Advisor, Graduate School of Education

INSTITUTION: Rutgers, The State University, New Brunswick, New Jersey

FEDERAL FUNDS REQUESTED: $24,194

DURATION: Beginning, May 1, 1965. Ending, December 31, 1965.

Objective: To devise a teacher technology center for keeping vocational-technical teachers updated in their field of technology, as well as abreast of new pedagogical developments.

Procedures: Consultants will meet as a task force in a workshop environment to develop: (1) educational specifications for a vocational-technical teacher technology center, (2) architectural and engineering preliminary plans, (3) the outline of engineering specifications. The end product will become the basis for implementation through refinement of the design and engineering specifications and possible construction of the facility.

* Confirmation of letter contract dated May 1, 1965.

2. Utilities for above.
3. Light control.
4. Storage area easily accessible to outside ramp.
5. Separate area for production of visual aids, such as: slides, film strips, charts, transparencies, etc.
6. Total area, including storage, to be approximately 2000 square feet.

D. Model development unit
1. To produce teaching-learning aids (wood, metal, plastic, etc.)
2. Design, develop prototype of units and systems.
3. Mass produce in industrial firms (after initial development).
4. Minimum size approximately 600 to 1000 square feet.
5. Need utilities and services as educational modules.

E. Innovations, experimentation center
1. Office space for two people, approximately 200 square feet.
2. Continuous effort to determine needs in vocational education.
3. Work with people to find solutions to identified needs.

F. Production and recording center
1. Adequate provision for proper: lights, acoustics, noise control.
2. Provision for: adequate ceiling height, door size.
3. Control room.
4. Size approximately 900 square feet.

XIV. SUMMARY OF SPACES, AREAS, AND SERVICES IDENTIFIED

Space, Area, or Service	Approximate Size	Access to	Remarks
A. Modules			
1. Small module	1200 sq. ft.	Staging, observation	Relation to ramp, storage
2. Small module	1200 sq. ft.	Staging, observation	Layout, drafting, and planning center, etc.
3. Medium module	2000 sq. ft. (Plus toilets & lockers)	Staging, observation	Relation to ramp, storage
4. Heavy module	2000 sq. ft. (Plus toilets & lockers)	Staging, observation	Relation to ramp, storage
B. Ancillary spaces (Inside)			
1. Administrative suite		Main entrance, hall, lounge	
a. Director's office	224 sq. ft.	Other offices	Closet and storage space in area closed by doors
b. Asst. Director's office	140 sq. ft.	Other offices	Closed storage area
c. Secretarial office	600 sq. ft.	Other offices, entrance, lounge	Storage, safe, machine room, intercom control
2. Programming office	400 sq. ft.	Modules	Division for 2 units
3. Technicians' area	200 sq. ft.	Modules	Include storage and complete utilities
4. Custodial room	200 sq. ft.	Utilities	Storage, sink, some utilities
5. Public lounge	400 sq. ft.	Administrative suite	Have kitchenette
6. Employee's lounge	400 sq. ft. - 1000 sq. ft.	Modules	Space for vending machines
7. Coadjutant staff workroom	200 sq. ft.	Modules and learning spaces	Built-in storage and coat rack

SUMMARY OF SPACES, AREAS, AND SERVICES IDENTIFIED (continued)

Space, Area, or Service	Approximate Size	Access to	Remarks
8. Utilities	Code (As needed)	Equipment room	Master controls for all
9. Instructional observation	400 sq. ft.	Modules	Access to entrance
10. Storage-mill-wright type	600 sq. ft.	Modules	Uncrating, checking, etc.
11. Central service for instructional equipment	400 sq. ft.	Modules	For instructional equipment
12. Exhibit and display space	4 units each 2' x 10' (or more)	Lounge, office, observation area	Glassed in; safe location; attractively designed
13. Rest rooms	Code (For guests)	Lounge, entrance	For male and female
14. Common rest rooms and locker rooms (students in two small modules)	Code (40 people minimum)	Small modules	For male and female (25 male; 15 female)
15. Staging area	600 sq. ft. (each)	Modules	One or more depending on design
16. Equipment room	Code (as needed)	Utilities room	Heating, air conditioning, air, hydraulics, etc.
17. Central control for audio-visual distribution	400 sq. ft.	TV studio; observation area	Distribution center
18. Individual learning spaces	6 carrels each 6' x 8'	In library	With ear phones, audio and visual receivers (controlled)
19. Multigroup instructional area	2100 sq. ft.	Modules, hall, employees' lounge	3 rooms each 30' x 20' with portable stage 10' x 30'

SUMMARY OF SPACES, AREAS, AND SERVICES IDENTIFIED (continued)

Space, Area, or Service	Approximate Size	Access to	Remarks
20. First aid room	80 sq. ft. (8' x 10')	Modules, group instruction room	Near toilets
21. Refrigerated storage room	80 sq. ft.	All modules	Utilities and drains
22. Large group instructional area	For 300 - 400 people	Hall modules, employee's lounge	Audio-visual, light control, tier seating
C. Ancillary spaces (outside)			
1. Demonstration area	Total area of 12,000 sq. ft.; 4000 sq. ft. concrete	Parking lot	All utilities; drain
2. Loading dock	300 sq. ft. (each)	Ramp; modules	One or more depending upon design; under cover
3. Parking	80 - 100 cars	Demonstration area; physical plant	Lights; access control; drain; landscaping
4. Isolated storage	Code (or 12' x 18')	Away from building	2 units, one for gases, one for other combustibles

SUMMARY OF SPACES, AREAS, AND SERVICES IDENTIFIED (continued)

Space, Area, or Service	Approximate Size	Access to	Remarks
D. Resource center			
1. Library *	1200 sq. ft.	Curriculum center	Carrels; microfilm, etc.
2. Curriculum center	4000 sq. ft. (total)	Library	
*a. Development area	1000 sq. ft.	Evaluation area	Functional divisions as: For 10 teams of 2 each
*b. Reproduction area	2000 sq. ft.	Development; evaluation	Reproduction equipment; storage area (separate); visual aid production. Secretarial suite for 3-4 typists (separate space of total)
c. Evaluation and research area	1000 sq. ft.	Development	Center for data collection; office for 2 staff and secretarial staff.
3. Model development unit	600 sq. ft.	Modules	Develop prototypes; wall storage for tools, etc. All basic utilities.
4. Innovations center	200 sq. ft.	Convenient to public	Identify needs; formulate solutions to problems
5. Studio -- TV	900 sq. ft.	Control room	Production and distribution of TV, video tape, etc.

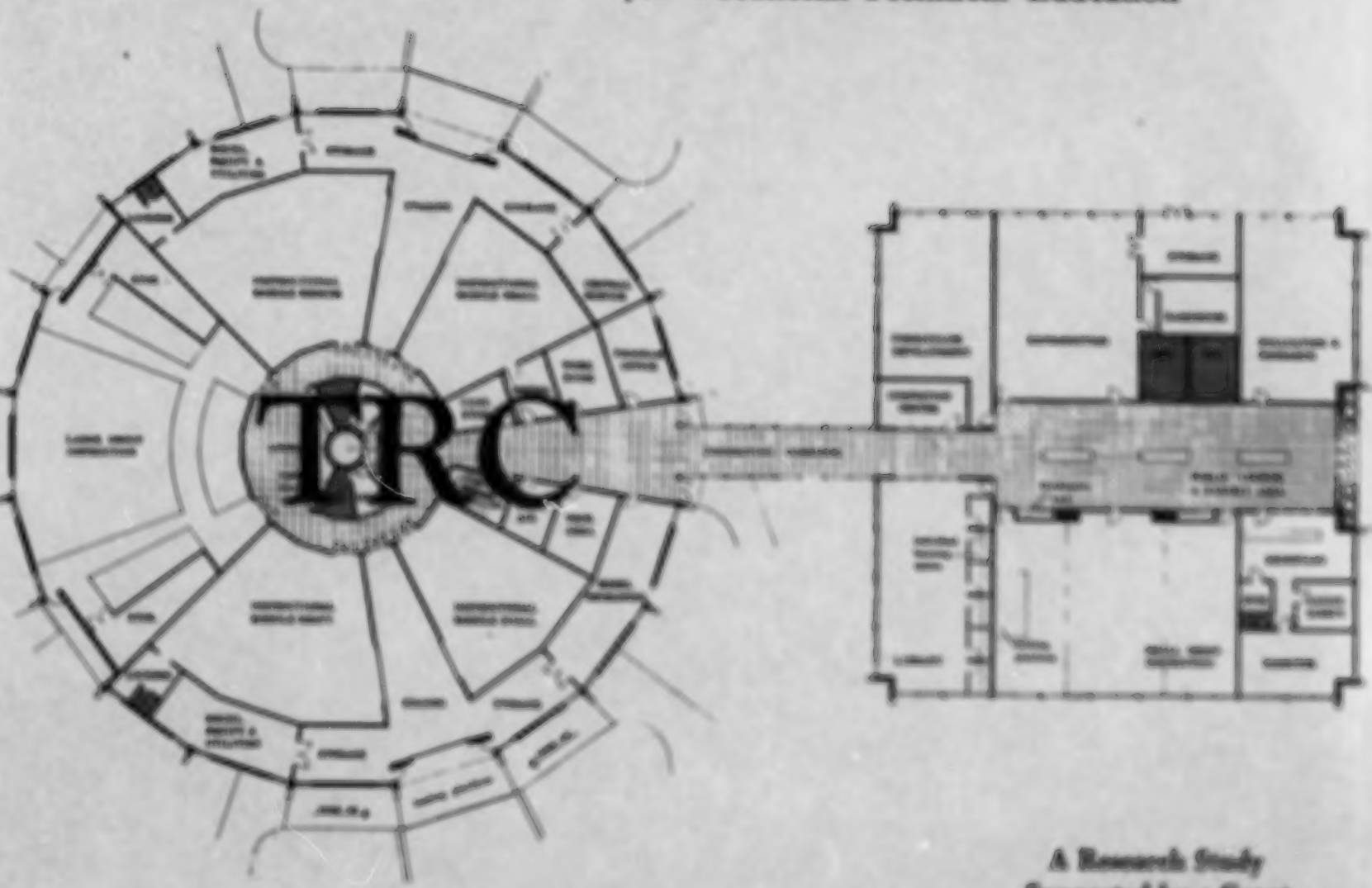
*Provide basic office space

XV. Other Considerations

With the rapid advance being made in electronic data storage and retrieval, and in computerized production systems, provision for a central computer facility, as part of the Resource Center, may be highly desirable. Rate of obsolescence of such equipment suggests careful research immediately prior to formulation of plans for implementation of the concept.

Technology-Resource Center

for Vocational-Technical Education



A Research Study
Supported by a Grant
under the
Vocational Education Act
of 1963 Section (4)c

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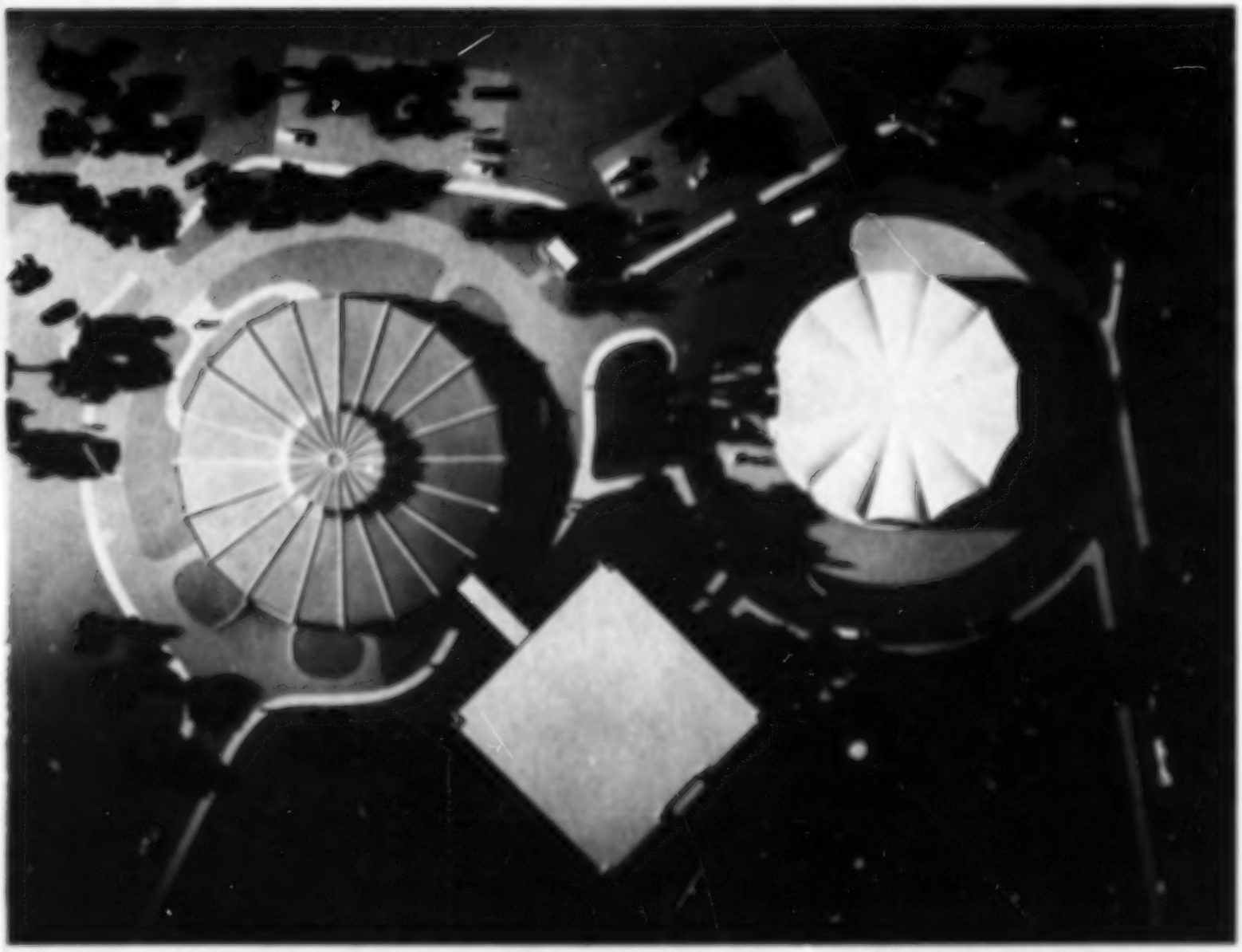
A Research Activity of
RUTGERS - THE STATE UNIVERSITY
New Brunswick, New Jersey

The information contained in this brochure is the result of the research findings of the project: A VOCATIONAL-TECHNICAL TEACHER TECHNOLOGY CENTER — THE DEVELOPMENT OF A MODEL. This project was supported by a grant under Section 4(c) of the Vocational Education Act of 1963.

The purpose of this grant was to plan a model facility for updating vocational-technical teachers. The planning includes the development of the educational specifications, preliminary architectural plans, and outline of engineering specifications.

It is hoped that this model may serve as a pattern for other institutions of higher education or State departments of education in the development of TECHNOLOGY-RESOURCE CENTERS FOR EDUCATION on an area basis throughout the United States.



Aerial View of Technology Research Center for Vocational-Technical Education

Technology-Resource Center

for Vocational-Technical Education

A new innovation in facilities planning to expedite updating of in-service personnel of vocational-technical schools; enriching both undergraduate and graduate teacher education programs; and, also providing research, development, and evaluation of new instructional media such as curricula, materials, models, and devices.

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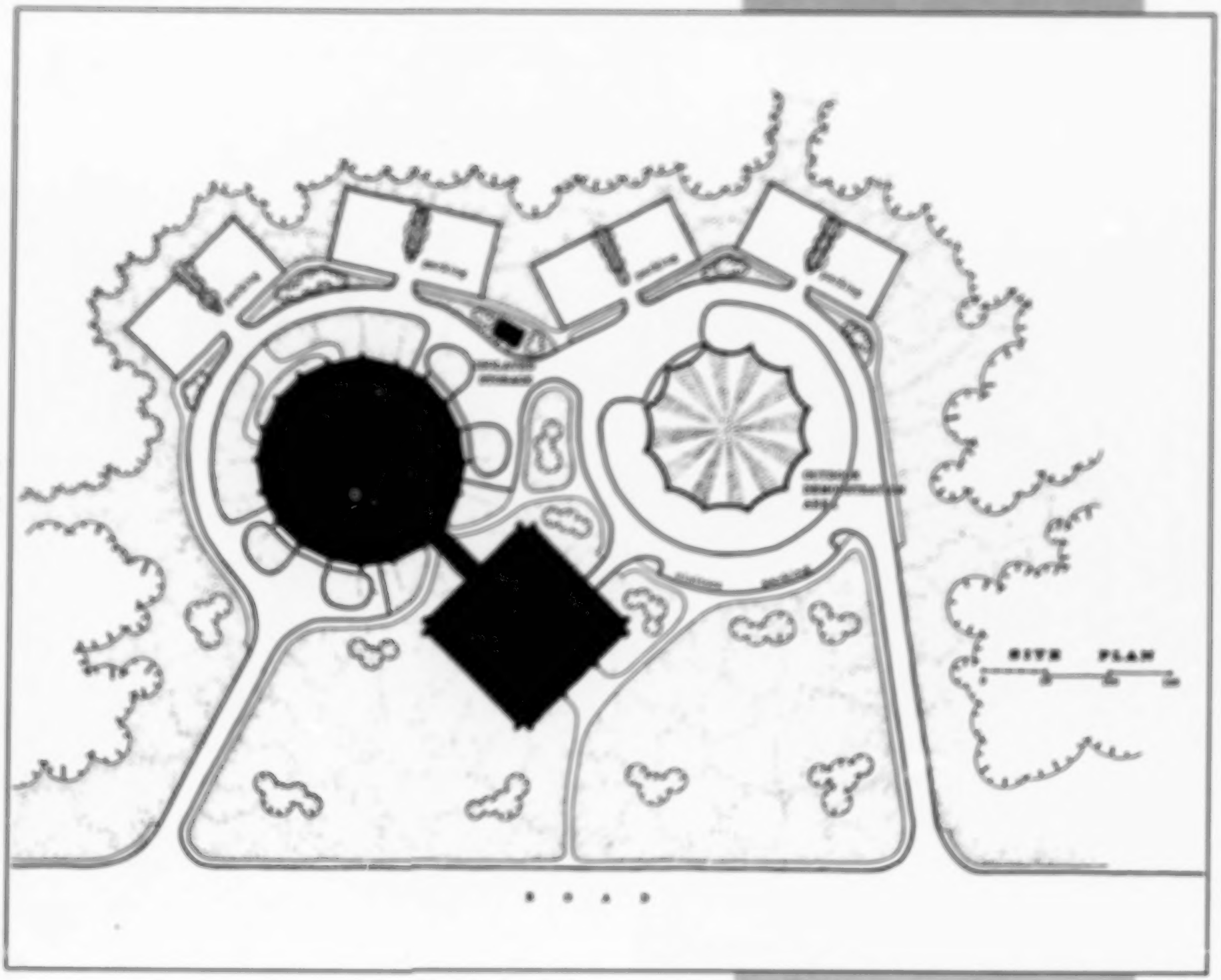

SITE PLAN

A New Concept

Technology changes rapidly as a reflection of scientific research and industrial and business development.

Education for today and tomorrow, to be effective, needs to be based on current concepts and applications.

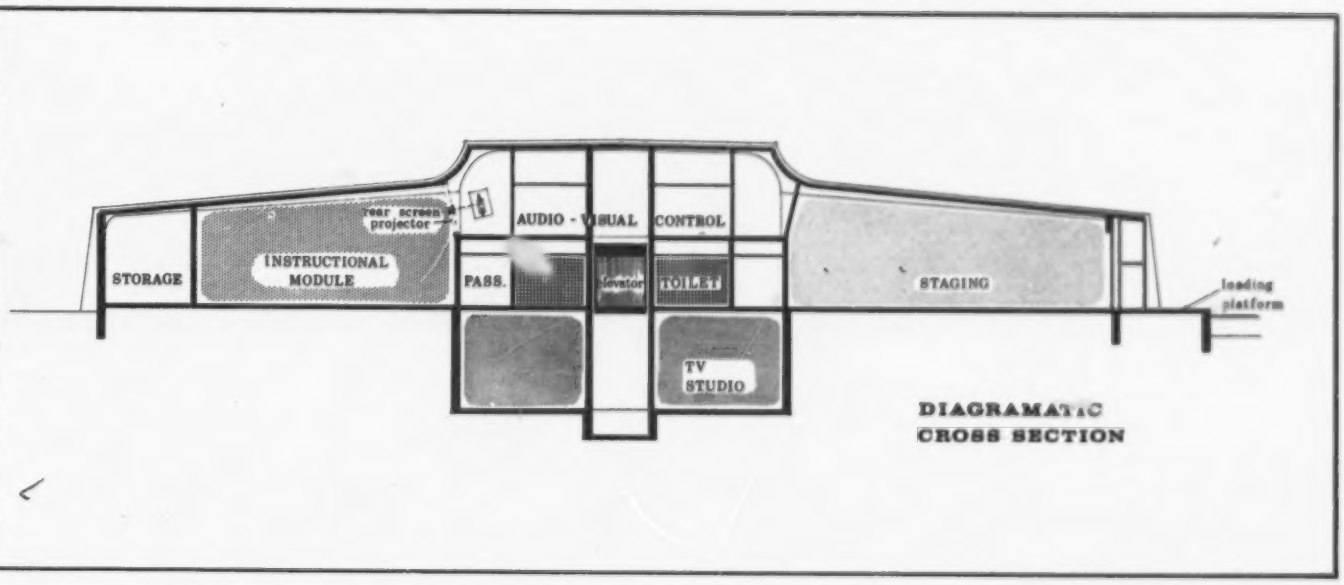
Updating of the principles of science to new applications of production and service for industry, business, and agriculture is also a major concern of education.

Vocational-technical educators, and especially teachers, require current information and familiarity with new "hardware" innovations to be effective.

The need of overcoming obsolescence is one of the greatest challenges facing vocational-technical educators today.

A new concept in teacher education and in-service growth is recognized as a supplement to existing programs, activities, and facilities.

Satisfactory implementation of this new concept mandates a unique facility for these updating and enriching activities — A Technology-Resource Center for Vocational-Technical Education.



DIAGRAMATIC CROSS SECTION

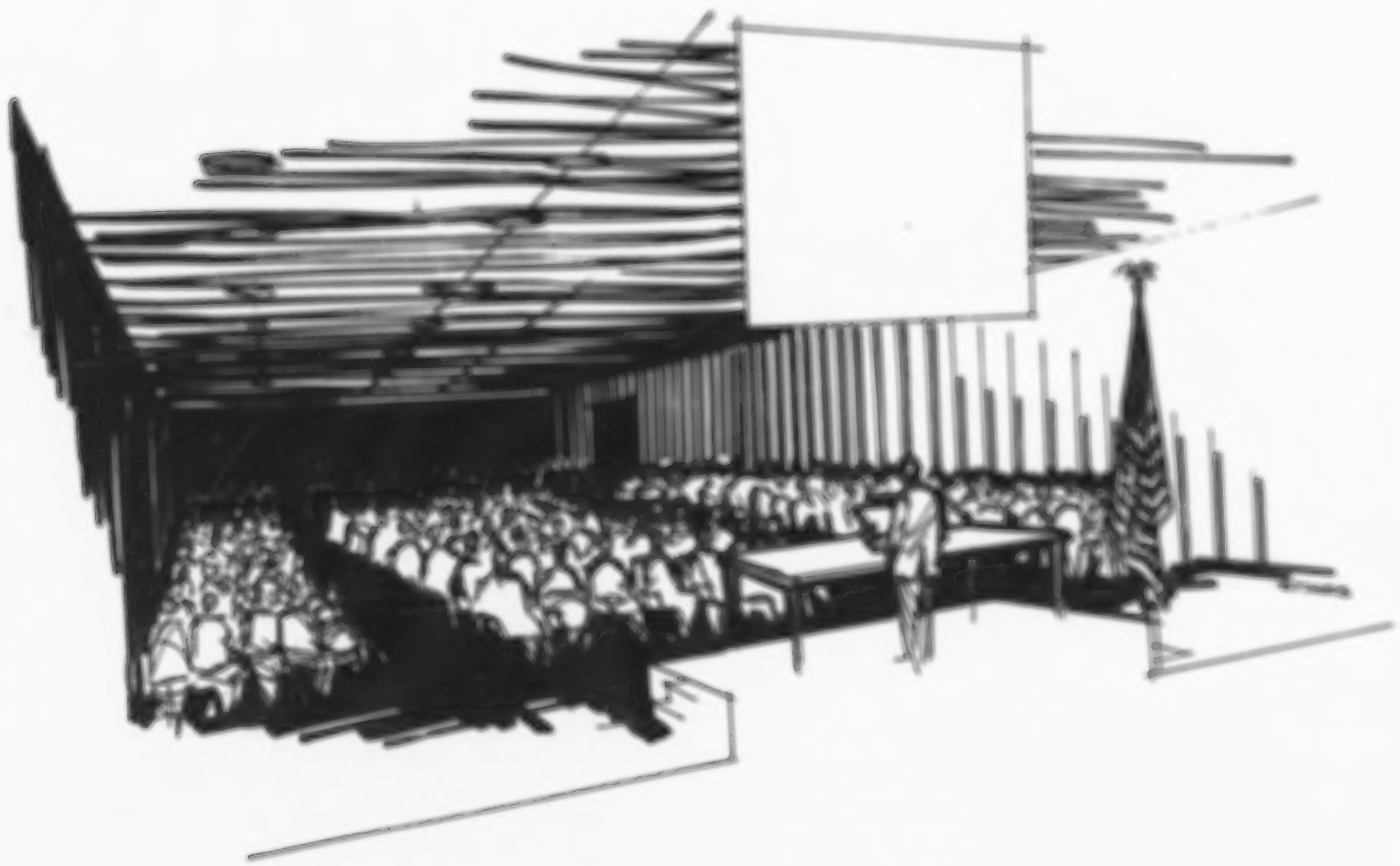
Diagramatic Cross Section

Purpose

The purpose of the Technology-Resources Center is to provide a maximum of service to educators. It must represent the ultimate in educational innovations, so as to inspire and motivate, enrich the background and broaden the scope, enlarge the scientific and technical knowledge and understanding, and increase the ability to apply, in practical situations, the experiences gained.

The Technology-Resources Center is the innovation of a new and unique institution specifically designed for keeping present and future vocational-technical educators aware of new developments in technology, new "hardware", new pedagogical developments.

The Center consists of two main divisions, (1) the technology complex, and (2) the resources complex. The technology complex is devoted to updating and enriching of the vocational-technical instructional program. The resources complex is designed to supplement the teaching-learning process through curriculum research, development, evaluation and dissemination; model and innovations development; and other research oriented investigations into the improvement of teaching-learning techniques, methods, and materials.



Large Group Instructional Area

Small Group Instructional Area

Area Served

The unique characteristics of the Technology-Resource Center suggest an area or regional division of service which may be interstate as well as intrastate. Cooperation of two or more states in such an institution may not only be highly likely but extremely desirable.

Personnel Planned For

The Center is especially planned to meet the needs of in-service teachers, supervisors, guidance personnel, and administrators; it will provide enrichment for undergraduate and graduate students in teacher education; its facilities will be helpful to industrial practitioners and others in positions of leadership in business and industry.

Operational Considerations

Planning, developing and conducting programs and activities of the Center, in cooperation with other institutions of higher education will utilize and compliment other desirable and available public and private resources of equipment, technical knowledge, physical plants, and the like.

A base staff, serving on a full-time basis, needs to be provided for planning, coordinating, and providing continuous service. A supplemental call staff will need to be utilized to provide some of the aspects of technical and professional updating.

Curricula for updating educational personnel will need to reflect both horizontal articulation and vertical coordination. Horizontal articulation to express the concept of broad implications across the instructional fields; vertical coordination to indicate a level of program descriptive of "depth". Both of the above may be reflected in the same curricular activity.

Characteristics of the Physical Plant

It needs to be designed:

To meet the needs of short-time activities of such duration as 2-4 hours, 1, 2, or 3 days, 1, 2, or 3 weeks and a variety of combinations of short time spans.

To provide multi-purpose use.

For demonstration, and learning participation activities, in addition to lecture-discussions and conference-type updating activities.

To expedite moving in and out of units of the most recently developed "hardware". Convenient loading and unloading, handling, crating and uncrating, moving, and other millwright-related activities must be expedited.

To blend the functions of the Technology Center with the functions of the Resources Center to provide maximum utilization and opportunities to serve the needs of educators.

Characteristics of the Instructional Spaces

Institutes and workshops, demonstrations, and instructional methods seminars describe the broad classification of main activities of the Technology Center.

The word "module", as used in this research finding, is descriptive of a principal teaching-learning space for updating instructors and other educators relative to specific equipment, as well as applications, techniques, and processes utilizing this equipment. A module may be utilized for some or all of the functions of a laboratory, shop, or industrial demonstration, research, or production area.

The instructional suite of the Center consists of a minimum combination of modules together with the auxiliary spaces to provide required support activities. Multiples of modules may be used as desired to meet the needs identified.

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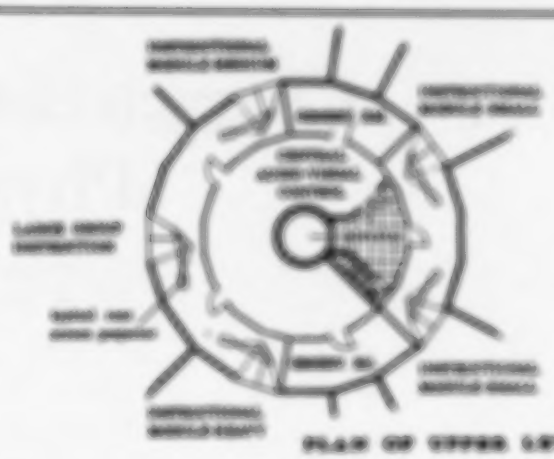
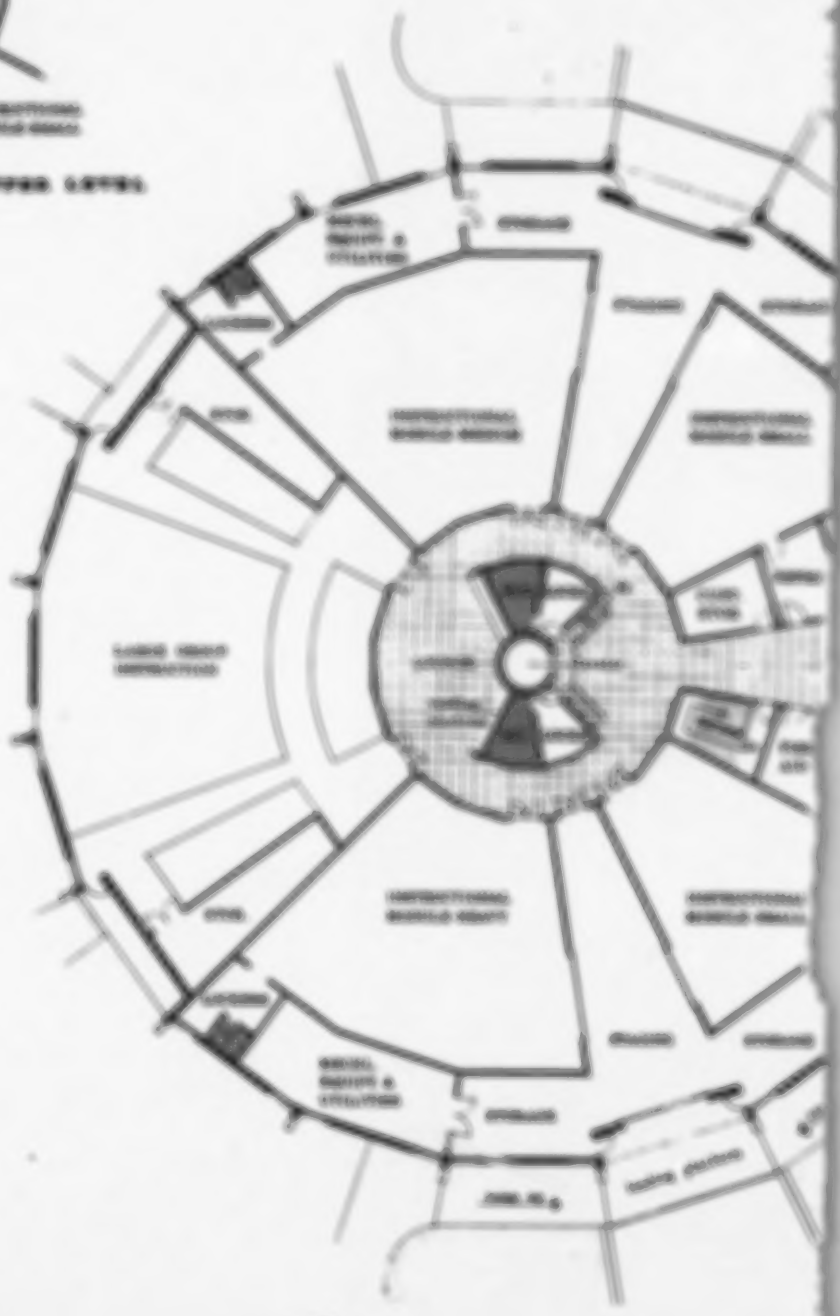
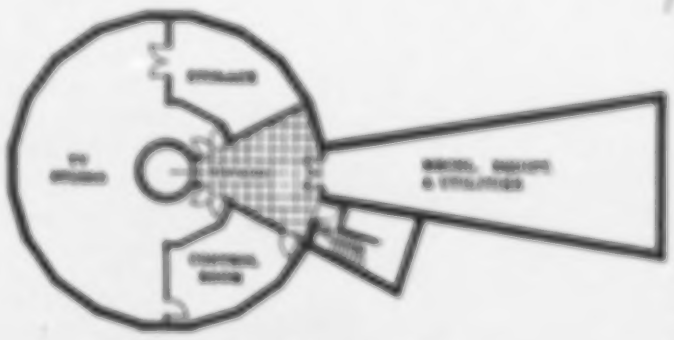
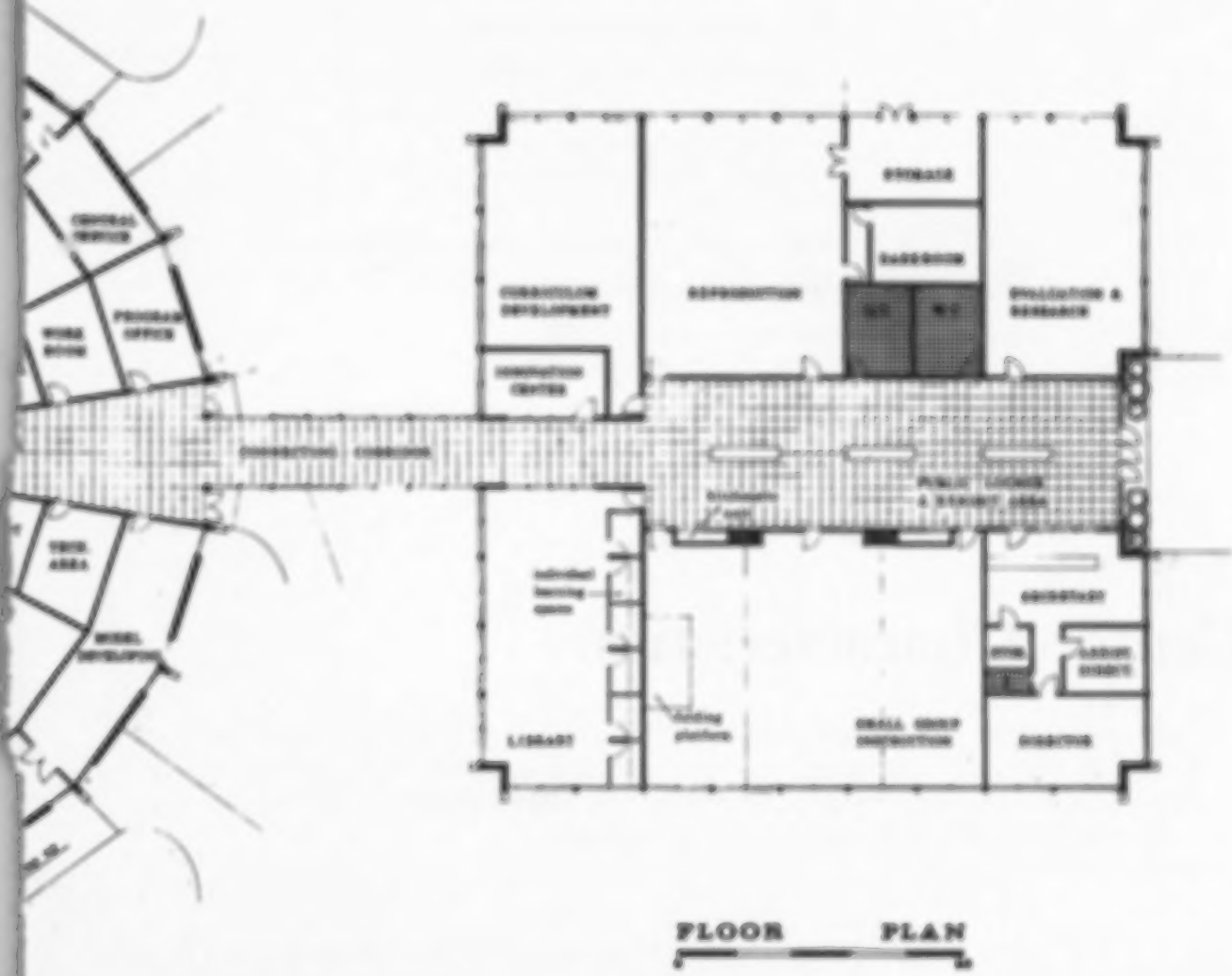


PLAN OF UPPER LEVEL





PLAN OF LOWER LEVEL



FLOOR PLAN

Technology Center Characteristics

Teaching-learning activities are focused in the four modules, the large group instructional area, and the multigroup instructional spaces. Significant planning considerations include needs such as:

- Relationship of spaces (modules and auxiliary)
- Access to and egress from spaces
- Ceiling heights, and door sizes
- Sizes and arrangements of spaces
- Environmental and light control
- Facilities for the use of equipment such as:
  - Rear screen projection
  - Audio-visual equipment
  - TV, etc.
- Staging area for preparing equipment for use
- Internal communication system
- Auxiliary spaces (inside)
- Demonstration area (outside) for extremely large equipment

Resources Center Characteristics

This complex is designed to supplement and strengthen the Technology Center and to provide additional educational services to vocational-technical education such as curriculum development (research, evaluation, and dissemination), model development, and the expediting of teacher education innovations.
Spaces are provided for:

- Library — technical materials, microfilm, carrels, etc.
- Curriculum development — evaluation, and reproduction
- Evaluation and research — for curriculum and other related activities
- Model development unit
- Innovations center — experimentation
- Production and recording center — slides, films, etc.

Architectural Concept

The fundamental concept behind the circular plan is the creation of an enclosed space interrupted by as few columns or permanent facilities as possible. During the planning studies, and as the general concept evolved, certain principles and criteria were formulated to guide the physical planning of the center. Elsewhere in this study, concept, purpose and characteristics of the physical plan are noted.

The ability of servicing the four modules led to an intriguing possibility: It is possible to cluster all auxiliary spaces around a circular core module. The center is designed on three levels; the lower level, technology complex level, and audio-visual and observation level. The lower level accommodates a television studio, control room, storage and mechanical equipment-utilities room. The technology complex level provides for the four modules, large group instructional room, mechanical equipment and utility room, storage, staging, lounge, etc. The upper level provides for a central audio-visual control area, observation rooms, rear screen and television projection windows. All levels are serviced by a central core elevator.

The four modules provide for instructional groups of varying sizes and fields of study. The modules are readily serviced by rear platform delivery docks for varying sizes of equipment, staging areas for receiving and shipping and storage areas for instructional materials. Non-instructional areas are designed to accommodate and service the four modules which are the heart of the center.

The resource complex is joined by a glass connecting corridor to the technology complex. This complex provides facilities oriented for improvement of teaching-learning techniques and administration. The small group instructional area is subdivided by two removable acoustical doors. Instructional space can be divided into three rooms or one large lecture-demonstration room with complete demonstration facilities.

Other areas, such as, evaluation and research, darkroom, reproduction, curriculum development, innovation center, and library provide space and facilities to supplement the teaching-learning process. A public lounge and exhibit area allows for business, agriculture and industry to continuously display new materials and products.

To accommodate the display and instruction of large equipment, products, and vocational agricultural requirements, an outdoor demonstration area is planned.

Outline of Architectural Considerations

Structural System
Precast concrete frame and structural purlins.

Floor Construction
Concrete floor slab on grade.

Exterior Walls
Precast concrete frames and panels.

Roof Construction
Insulating deck with plastic membrane roofing.

Interior Partitions
Lightweight concrete block.

INTERIOR FINISHES

Corridors
Floor—Terrazzo
Walls—Vitreous enamel on block
Ceilings—Acoustical

Instructional Modules
Floor—Concrete or Terrazzo
Walls—Exposed block with acoustical treatment
Ceiling—Acoustical

Large Group Instruction
Floor—Carpet
Walls—Exposed block with acoustical treatment
Ceiling—Acoustical

Storage and Staging Areas
Floor—Concrete
Walls—Exposed block
Ceiling—Exposed construction

Toilets
Floor—Ceramic tile
Walls—Ceramic tile
Ceiling—Acoustical

Lounge and Exhibit Area
Floor—Carpet
Walls—Plaster and wood paneling
Ceiling—Acoustical

Library and Small Group Instruction
Floor—Carpet
Walls—Plaster and wood paneling
Ceilings—Acoustical

Typical Office Space
Floor—Carpet
Walls—Plaster and wood paneling
Ceiling—Acoustical

Fenestration

Aluminum frame with glare reducing glazing.

Lighting

Instructional modules, group instruction areas, library and resource center offices will be lighted with fluorescent fixtures. The modules will be provided with a minimum of 100 foot-candles, all other instructional areas with a minimum of 50 foot-candles.

Corridors, storage areas, lounge and miscellaneous areas will be provided with incandescent and fluorescent fixtures.

Electrical System

Main electrical service and panels in mechanical equipment room. All raceways in conduit or armored cable throughout.

Audio-visual control cables installed in conduit.

All conduit to be oversized to accommodate future needs.

Heating and Ventilating — Air Conditioning

Central forced air system with electric heating cooling exchangers.

Ventilation will be provided on the basis of three (3) air changes per hour during heating and cooling cycles and six (6) air changes per hour during interim periods. Exhaust will be through wall registers; central duct system; exhaust fan and fall louver.

Temperature control (and humidity where required) will be an electronic system on an individual room basis. Electronic air cleaners will be provided to remove dust, smoke, etc.

Plumbing

Plumbing system shall provide for water, waste, gas and storm drainage.

Special

Service Columns—In all instructional modules and demonstration areas service columns (which provide electric, hot and cold water, air, waste, natural and special gases, liquids and audiovisual outlets) shall be provided.

Lighting—Landscaping—Well planned lighting will give the building interesting effects after dark as well as during the day. Since the facility will be used during the evening, adequate lighting in the parking areas is necessary.

Utilities—Underground services are planned with the capability of expansion considered.

Lounge and Exhibit Area

Pedagogical Hardware

The Technology-Resource Center will provide the most effective and up-to-date pedagogical hardware. It should serve as a "showplace" for the effective utilization of such aids and a nucleus for recent innovations in teaching-learning media.

Illustrations of the types of aids considered for the modules and other teaching-learning spaces are:

- White Chalkboard (Necessary for teaching wiring for data processing)
- Multi-track Chalkboards, Bulletin Boards, Flannel Boards, etc.
- Rear Screen Projection
- Closed Circuit TV
- Projection TV (for magnification in modules)
- Student Response Stations in Multigroup Instructional Area
- Chart Racks
- Display Racks
- Data Retrieval System

Site Planning

Location

Controlled location with respect to schools utilizing this service—easy accessibility from highways and turnpikes for deliveries.

Size or Area

A ten acre site would seem to be desirable to facilitate the building complex, demonstration area, parking and service roads.

Growth

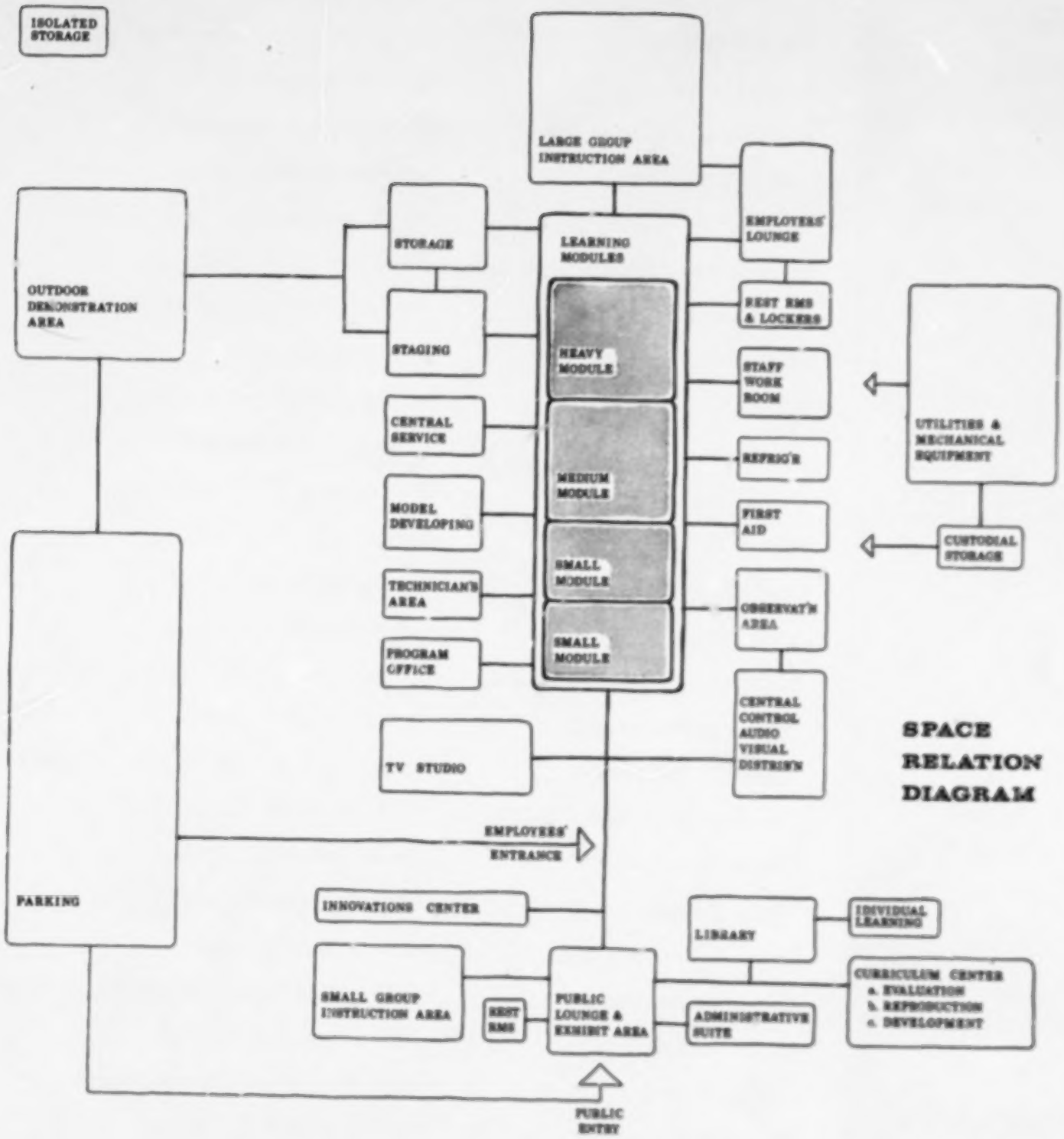
Additional module group could replace outdoor demonstration and be connected to Resources Center.

Orientation

The main consideration would be the projection of the outdoor demonstration from the prevailing winds.

Roadways, Traffic and Walks

Ease of delivery and access to building from parking areas is important. Parking is planned at the rear to eliminate "Shopping Center" appearance.



Space Relation Diagram

Panel of Consultants

The following individuals participated as members of the panel or assisted in other ways in the research project:

* RALPH E. BENDER	Ohio State University	Professor and Chairman—Agricultural Chairman
* PAULINE BURBRINK	University of Texas	Specialist—Distributive Education
* WILLIAM DUNTON	Warren City Schools, Warren, Ohio	Building Consultant Specialist
* JOSEPH CASEY	Leeds & Northrup Company	Technical Consultant
BURR D. COE	New Brunswick, New Jersey	Director—Middlesex County Vocational-Technical H. S.
THEODORE COTE	State Department of Education, New Jersey	Director—Professional Services
CHARLES DRAWBAUGH	Rutgers - The State University	Assistant Professor Vocational-Technical Education
* NICHOLAS ECKERT	New Brunswick, New Jersey	Architectural Consultant
PHILIP EDGECOMB	Rutgers - The State University	Research Specialist
NICHOLAS FRIGIOLA	State Department of Education, New Jersey	Director—Technical Education
ELAINE W. HOUSE	Rutgers - The State University	Research Associate
GERALD GRIESS	Rutgers - The State University	Lecturer in Education
ROBERT JOY	State Department of Education, New Jersey	Director—Distributive Education
* MILTON LARSON	Rutgers - The State University	Adviser—Technical Education
EMIL J. LISAK	State Department of Education, New Jersey	Director—Vocational Education in the Comprehensive H. S.
KENNETH MILLER	Rutgers - The State University	Teacher Education
JOHN O'BRIAN	Rutgers - The State University	Associate Professor—Trade and Industrial Education
* C. THOMAS OLIVO	State Department of Education, New York	Trade and Industrial Education
* MAURICE RONEY	Oklahoma State University	Director—Industrial Education
RALPH RUSH	Rutgers - The State University	Lecturer in Education Vocational-Technical Education
MERNA SAMPLES	Rutgers - The State University	Chairman, Home Economics
* CARL SCHAEFER	Rutgers - The State University	Chairman, Department of Vocational-Technical Education
BENJAMIN SHAPIRO	Rutgers - The State University	Director—Curriculum Laboratory
* ELIZABETH SIMPSON	University of Illinois	Head—Home Economics Teacher Education
* G. M. TORKELSON	University of Washington	Professor—Audio-Visual Education
BRUCE TUCKMAN	Rutgers - The State University	Associate Professor of Education
* ARTHUR WALKER	Richmond Professional Institute	Professor—Business Education
ALVIN WEITZ	State Department of Education, New Jersey	Supervisor—Business Education

* Principal Consultants for Research Project.

A Vocational-Technical Teacher Technology Center-
The Development of a Model

A research project supported by a grant under the provisions of Section (4)c of the Vocational Education Act of 1963.

Intra-University Group

DR. MILTON E. LARSON
Principal Investigator
Department of Vocational-Technical Education
Graduate School of Education
Rutgers - The State University

DR. JOHN J. O'NEILL
Dean, Graduate School of Education
Rutgers - The State University

DR. ROBERT M. WORTHINGTON
Assistant Commissioner in Charge of Vocational Education
State of New Jersey

DR. ERNEST E. McMAHON
Dean
Continuing Education
Rutgers - The State University

DR. CARL J. SCHAEFER
Chairman
Department of Vocational-Technical Education
Rutgers - The State University

Architectural Consultants

ECKERT AND GATARZ, ARCHITECTS
79 Paterson Street
New Brunswick, New Jersey

If additional information is desired contact:
Dr. Milton E. Larson, Principal Investigator
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Graduate School of Education
Rutgers - The State University
10 Seminary Place
New Brunswick, New Jersey

TECHNOLOGY-RESOURCE
CENTER
for Vocational-Technical Education

DISSEMINATION

I. American Vocational Association Convention

Dissemination of the concept and suggested implementation was enhanced through the American Vocational Association Convention. Display of the model, architectural design, and descriptive fliers effectively communicated the research findings to approximately 1,000 individuals in attendance. Announcements were made in three of the meetings. A thirty minute presentation was made by one of the consultants and the Principal Investigator at a session attended by approximately 100 individuals.

II. Dissemination Conference

A Dissemination Conference was held on December 17, 1965 at the Labor Education Center, New Brunswick, New Jersey. Approximately sixty guests attended, coming from eight different states including California, Oklahoma, and Illinois. The interest and comments indicated a high degree of enthusiasm for the new innovation. For additional information see the following pages.

III. Distribution of Brochures

Requests for the brochure have already come from several communities and a number of states. Brochures will be mailed to the Directors of Vocational Education of each of the State Departments of Education, as well as to the Deans of Colleges of Education of Universities identified with vocational-technical education in the United States.

IV. Dissemination Through Periodicals

At the time of this report, editors of three periodicals have expressed an interest in disseminating the concept through their magazines. An illustrated feature story was printed in The Daily Home News on December 18, 1965.

V. Evidences of Interest

A strong interest in the concept has been expressed by officials of three states, with recognition of the significance of the concept by influential citizens of several others. A major metropolitan area is very seriously being considered, at the present time, as the location of the first Technology-Resource Center.

VI. Continued Dissemination and Development of the Concept

Provision for continued dissemination of the concept, with assistance to interested institutions or units of government, is desirable to expedite implementation through facilities construction and program development. Only through such a continuous effort can the goals of this research effort be vitalized.

DISSEMINATION CONFERENCE PROGRAM

RESEARCH PROJECT: A VOCATIONAL-TECHNICAL TEACHER TECHNOLOGY CENTER-
THE DEVELOPMENT OF A MODEL

Friday, December 17, 1965 — Labor Education Center, (Ryders Lane at Clifton Avenue, New Brunswick, New Jersey)

General Chairman - Carl Schaefer, Chairman, Department of Vocational-Technical Education

A.M.

9:30 Opening
- A. Welcome - John J. O'Neill, Dean, Graduate School of Education
  - Ernest McMahon, Dean, Continuing Education
- B. Introductions and Announcements

10:00 The idea
- A. Conception - Carl Schaefer, Chairman, Department of Vocational-Technical Education
- B. Development - Milton Larson, Principal Investigator, Research Project

10:45 The architectural design - Nicholas Eckert, Architectural Consultant, Eckert and Gatarz, New Brunswick, New Jersey

12:00 Implications for the United States - Sidney High, Project Director, Division of Adult & Vocational Research, U.S. Office of Education, Washington, D.C.

P.M.

12:30 Lunch
Neilson Dining Hall, Agricultural School Campus

2:00 Discussion of implementation and suggestions (Group Sessions)

3:00 Report of Discussion Groups
A five minute report by each group secretary

3:25 Announcements

3:30 Implications for New Jersey and Conference Summary
Robert Worthington, Assistant Commissioner in Charge of Vocational Education State of New Jersey

4:00 ADJOURN

GUESTS PRESENT FOR THE DISSEMINATION CONFERENCE

NAME	POSITION/EMPLOYER	ADDRESS
Melvin L. Barlow	Prof. of Education, UCLA	Los Angeles, Cal.
Lowell A. Burkett	Executive Director American Vocational Assoc.	Washington, D.C.
Joseph E. Casey	Manager, Professional Prog. Leeds & Northrup	Philadelphia, Pa.
Charles C. Drawbaugh	Assistant Professor Rutgers-The State Univ.	New Brunswick,N.J.
Nicholas Eckert	Architectural Consultant Eckert and Gatarz	New Brunswick,N.J.
Philip L. Edgecomb	Asst. Prof. & Job Corps Coord., Rutgers-	New Brunswick,N.J.
Lynn A. Emerson	Consultant, State Dept. of Education	Trenton, N.J.
Peter Fedorocko	Director, Distributive Ed. Freehold Regional H.S.	Freehold, N.J.
William N. Fenninger	Executive Sec'y, American Technical Educ. Assn.	Delmar, N.Y.
Frederic C. Finsterbach	Director Voc. Teacher Ed. State Dept. of Education.	Trenton, N.J.
Douglas Frech	Chairman Related Arts Dept. West Morris Reg. H.S.	Chester, N.J.
Nicholas F. Frigiola	Director of Technical Educ. State Dept. of Education	Trenton, N.J.
Robert Glassett	Director, Somerset County Voc-Tech. Schools	Somerville, N.J.
Charles F. Green	Superintendent, Warren Co. Vocational Board of Educ.	Washington, N.J.
Jerald A. Griess	Lecturer in Ed. & Coord. of COPE, Rutgers -	New Brunswick, N.J.

NAME	POSITION/EMPLOYER	ADDRESS
Ronald W. Hasse	Educational Facilities Laboratories, Inc.	New York, N.Y.
Florence L.D. Heal	State Supv. of Home Econ. State Dept. of Education	Trenton, N.J.
Sidney High	Project Officer,Off. of Ed.	Washington, D.C.
Elaine W. House	Dept. of Voc.-Tech. Educ. Rutgers - The State Univ.	New Brunswick,N.J.
Thomas W. Inter	Director, Kent Co. Voc.-Tech. Center	Woodside, Dela.
Walter Benton Jones	Emeritus Professor of Ed. University of Penna.	Lansdown, Pa.
Ray Karnes	Chairman, Dept. of Voc. Ed. University of Illinois	Urbana, Illinois
Harry J. Knodt	Public Relations & Personnel Cape May Co. Voc-Tech. School	Cape May, N.J.
Robert M. Knoebel	Head, Technical Education U.S. Office of Education	Washington, D.C.
Kenneth Kochey	Amer. Assoc. of Jr. Coll.	Washington, D.C.
Manuel Kurzberg	Director, Special Projects Johnson & Johnson	New Brunswick, N.J.
Milton E. Larson	Principal Investigator Rutgers-The State University	New Brunswick, N.J.
Harry S. Layton	Asst. Dean, University Extension Div.-Rutgers-	New Brunswick, N.J.
Lucian Lombardi	Chief, Bureau of Technical Instit., Conn, St. Dept. Ed.	Hartford, Conn.
Ernest E. McMahon	Dean, University Ext. Div. Rutgers-The State University	New Brunswick, N.J.
Gordon G. McMahon	Director, Div. Voc.-Tech. Ed., State Univ. Coll.	Oswego, New York

NAME	POSITION/EMPLOYER	ADDRESS
William C. McNeice	Dir. Voc. Facility Planning State Dept. of Education	Trenton, N.J.
Marie P. Meyer	Assoc. Prof. Voc-Tech.Dept. Rutgers-The State University	New Brunswick,N.J.
Kenneth E. Miller	Supervisor Voc. Teacher Tr. Rutgers-The State University	New Brunswick,N.J.
John B. Moulette	Supervisor, Public Infor. State Dept. of Education	Trenton, N.J.
John G. Nealon	Sr. Mfg. Research Engineer Lockheed Electronics Co.	Metuchen, N.J.
John O'Brian	Assoc. Prof. - Rutgers	New Brunswick,N.J.
John J. O'Neill	Dean, Graduate School of Ed. Rutgers-The State University	New Brunswick,N.J.
G.A. Ostergren	Planning Officer Rutgers-The State University	New Brunswick,N.J.
Neal B. Perkins	Superintendent, Bergen County Vocational Schools	Hackensack, N.J.
Charles A. Rosen	Industrial Relations Spec. N.J. Manufacturers Assoc.	Newark, N.J.
Ralph A. Rush	Distributive Education Rutgers-The State University	New Brunswick,N.J.
Carl J. Schaefer	Chairman-Dept. Voc-Tech.Ed. Rutgers-The State University	New Brunswick,N.J.
Benjamin Shapiro	Curriculum Laboratory Rutgers-The State University	New Brunswick,N.J.
H. Walter Shaw	Editor, Technical Education McGraw-Hill, Inc.	New York, N.Y.
James A. Sheaffer	Research Assistant Rutgers-The State University	New Brunswick,N.J.
Robert F. Shepherd	Special Repres. to Education Do All Co.	New York, N. Y.

NAME	POSITION/EMPLOYER	ADDRESS
E.H. Sommer	Consultant Leeds & Northrup	Philadelphia, Pa.
Helmer E. Sorenson	Dean of the College of Education, Oklahoma St. U.	Stillwater, Okla.
Clarence H. Stephans	Director, Relations/Indust. Newark College of Engin.	Newark, N.J.
Merle E. Strong	Assistant Director Program Services, U.S. Off. of Ed.	Washington,D.C.
Wilber O. Teeters	Past Asst. to V.P. for Research, Johnson & Johnson	New Brunswick,N.J.
Ann Trask	Program Specialist U.S. Office of Education	Washington, D.C.
Bruce W. Tuckman	Assoc. Prof. - Rutgers-	New Brunswick,N.J.
Robert M. Worthington	Asst. Commissioner, Voc.Ed. State Dept. of Education	Trenton, N.J.

THE DAILY HOME NEWS

NEW BRUNSWICK, N. J., SATURDAY AFTERNOON, DECEMBER 18, 1965.

MEETING OVER MODEL — This scaled-down construction of Rutgers University's latest research activity, a technology-resource center, is viewed by five of the approximately 75 educators who gathered for that purpose. From left, Carl J. Schaefer, chairman of the vocational-technical education department of the university; Sidney High, U. S. Office of Education project officer; Melvin L. Barlow, professor of education at UCLA; Milton A. Larson, principal investigator for the activity, and Nicholas Eckert, architectural consultant.

Model Technical Center 'Outstanding'

By CHARLES LIBRIZZI

A U.S. office of Education project officer labeled "outstanding" a model technology-resource center unveiled as a research activity of Rutgers University yesterday before some 75 educators.

"The group here at Rutgers has done an outstanding job," said Sidney High in describing the new concept in facilities for vocational-technical teachers.

Exciting Solution

High termed the model with three main buildings—two circular, one square—a "very remarkable, very exciting solution to the problem" of building needs for growing student population.

Although no such plans have been announced, High speculated: "I think the people at Rutgers are dead set at building this facility here."

He said he hoped that "any other state will not replicate it," but will leaven from it and "move their own design up a notch higher."

"Moving to ascending plateaus, that's the essence of the products we can make in the next few days," he concluded.

Robert M. Worthington, assistant commissioner of education for New Jersey, called it "a worthwhile project in the center of megapolis, that will take vocational education out of the barn or quonset hut and into a sophisticated, esthetically pleasing educational center.

"The funds available for this research project points up the way funds can stimulate creative thinking," he added. "This type of a facility is needed to update the present vocational educational facilities, all vocational education teachers and the total program.

To Update Teachers

"This is a systems approach to updating teachers, which is needed if we are to move to meet the 80 per cent of youth who are employment-bound."

Worthington predicted that the facility if realized, would "make Rutgers a center of advanced study in vocational education."

He said the facility is needed to provide new programs to prepare students for low level occupations as well as high level technical occupations.

"It should be sold primarily on the needs of youth and the needs of adults," concluded Worthington.

The fundamental concept behind the circular plan is the creation of an enclosed space interrupted by as few columns or permanent facilities as possible.

Suggested materials for the structural system are precast concrete frame with floors of concrete slab on grade; exterior walls of precast concrete frames and panels and the roofs of insulating deck with plastic membranes.

Interior partitions would be of lightweight concrete block and interior finishes of terrazzo for floors, vitreous enamel on block for walls, and acoustical ceilings.

There would be spaces for large group instruction, small group instruction, offices, a library, lounge and exhibit area, storage and staging areas, as well as lavatories.

One of the many participants who came from out of state said he has experienced lack of foresight on the part of builders in the past and asked if such a center could accommodate a possible projected figure of 1,000 students.

Milton E. Larson, the principal investigator for the project, replied that while an anticipated enrollment for future years is not known, the plans have been drawn to allow for expansion of facilities "triple what we have here" in the model.

Larson said such a facility would supplement and not supplant existing facilities.

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